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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/601,365	06/23/2003	Jiri Navratil	YOR920030110US1	1227

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EXAMINER	
JACKSON, JAKIEDA R	

ART UNIT	PAPER NUMBER
2626	

DATE MAILED: 09/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/601,365	NAVRATIL ET AL.	
	Examiner	Art Unit	
	Jakieda R. Jackson	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 June 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicants argue that Lowry fails to teach "wherein the frame of the first speech signal and residual signal contain a same fixed number of samples." Applicants arguments are not persuasive. Lowry teaches that the LPC analysis may be performed using any of the conventional methods. The speech signal and residual signal containing a same fixed number of samples is an inherent, standard feature that is old and well know in the art of LPC processing (column 5, lines 13-21). Some examples of this inherent feature is demonstrated in Thomas et al. (Figure 5.4) and Markel et al. (equation 1.12).

Additionally, Applicants argue that Lowry (column 5, lines 36-51) does not teach the feature of "applying a transformation function to the residual frame to obtain a modified frame, wherein the modified frame contains an integer number of pitch cycles. However, Applicants misquoted the cited passage.

Since Lowry, in fact, teaches the claimed limitations of independent claims 1, 11 and 21, the dependent claims remain rejected under the prior art.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. **Claims 1-4, 8, 11-14, 18, 21-24 and 28** are rejected under 35 U.S.C. 102(b) as being anticipated by Lowry (USPN 5,787,398).

Regarding **claims 1, 11 and 21**, Lowry discloses a method, computer program product and a data processing system, hereinafter referenced as a method comprising:

filtering a frame of a first speech signal to obtain a residual signal frame and a set of vocal tract model parameters (vocal tract components of a waveform; column 3, lines 8-22), wherein the frame of the first speech signal and the residual signal frame contain a same fixed number of samples (inherent in LPC processing);

determining from the residual signal frame at least one pitch cycle within the residual frame (at least two per pitch period; column 3, lines 25-35);

applying a transformation function (temporal spacing) to the residual frame to obtain a modified residual frame, wherein the modified residual frame contains an integer number of pitch cycles (re-form the desired speech signal; column 3, lines 36-51); and

synthesizing a second speech signal from the modified residual frame and the set of vocal tract model parameters (modified pitchmark to resynthesize speech from the residual; column 5, lines 2-6), whereby the second speech signal is a pitch-compensated speech signal (to give more consistent results; column 5, lines 24-35 and column 6, lines 15-25).

Regarding **claims 2, 12 and 22**, Lowry discloses a method wherein the integer number of pitch cycles is a predetermined integer number of pitch cycles (one window per pitch period; column 3, lines 36-51).

Regarding **claims 3, 13 and 23**, Lowry discloses a method wherein the integer number of pitch cycles is predetermined to be one (one window per pitch period; column 3, lines 36-51).

Regarding **claims 4, 14 and 24**, Lowry discloses a method wherein the transformation function changes a time scale of a residual signal represented by the residual signal frame (residual signal; column 1, lines 57-63).

Regarding **claims 8, 18 and 28**, discloses a method wherein the transformation function generates a modified residual signal frame from the residual frame by performing operations that include:

mapping to zero a first subset of sample from a residual represented by the residual signal frame (mapping each sample; column 4, lines 5-17); and

mapping a second subset of samples from the residual signal to their identical values (original sampling rate; column 4,lines 5-17).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. **Claims 6-7, 10, 16-17, 20, 26-27 and 30** are rejected under 35 U.S.C. 103(a) as being unpatentable over Lowry in view of Chuang (USPN 4,941,178).

Regarding **claim 6, 16 and 26**, Lowry discloses a method wherein the speech signal is pitch-compensated, but does not specifically teach wherein the transformation function changes the time scale of the residual signal by performing a non-linear time warping operation on an interval of the residual signal so as to find a correspondence between samples from the interval of the residual signal and samples in a reference signal.

Chuang teaches speech recognition using preclassification and spectral normalization wherein the transformation function changes the time scale of the residual signal by performing a non-linear time warping operation (the dynamic time warp technique performs a nonlinear time sequence adjustment) on an interval of the residual signal so as to find a correspondence between samples from the interval of the residual signal and samples in a reference signal (to bring it into closer match; column 6, lines 8-18), to carry out phonetic preclassification.

Therefore, it would have been obvious to one ordinary skilled in the art at the time the invention was made to modify Lowry's method wherein the transformation function changes the time scale of the residual signal by performing a non-linear time warping operation on an interval of the residual signal so as to find a correspondence between samples from the interval of the residual signal and samples in a reference signal, as taught by Chuang, to carry out phonetic preclassification, since words can be

spoken at different rates, one can not expect that the slope vectors will match the prototype exactly over time (column 6, lines 8-18).

Regarding **claims 7, 17 and 27**, Lowry discloses a method wherein the speech signal is pitch-compensated, but does not specifically teach wherein the non-linear time warping operation is performed according to a dynamic time warping algorithm.

Chuang teaches speech recognition using preclassification and spectral normalization wherein the non-linear time warping operation is performed according to a dynamic time warping algorithm (dynamic time warp technique; column 6, lines 8-18), to perform a nonlinear time sequence adjustment.

Therefore, it would have been obvious to one ordinary skilled in the art at the time the invention was made to modify Lowry's method wherein the non-linear time warping operation is performed according to a dynamic time warping algorithm, as taught by Chuang, to perform a nonlinear time sequence adjustment if the incoming vector sequence to bring it into closer match with the prototype to which it is being compared (column 6, lines 8-18).

Regarding **claims 10, 20 and 30**, Lowry discloses a method wherein the speech signal is pitch-compensated, but does not specifically teach the method further comprising feeding the modified residual signal frame to at least one of speech recognition and speaker recognition software.

Chuang teaches speech recognition using preclassification and spectral normalization further comprising feeding the modified residual signal frame to at least

one of speech recognition and speaker recognition software (figure 1A with column 3, lines 54-58), for generating speech vectors.

Therefore, it would have been obvious to one ordinary skilled in the art at the time the invention was made to modify Lowry's method wherein it further comprises feeding the modified residual signal frame to at least one of speech recognition and speaker recognition software, as taught by Chuang, to demonstrate the typical formant peaks in the spectrum resulting form the vocal tract resonance (column 3, lines 54-63).

6. **Claims 9, 19 and 29** are rejected under 35 U.S.C. 103(a) as being unpatentable over Lowry in view of Moriya et al. (USPN 5,651,090), hereinafter referenced as Moriya.

Regarding **claims 9, 19 and 29**, Lowry discloses a method wherein the speech signal is pitch-compensated, but does not specifically teach a method comprising cyclically shifting samples in the modified residual signal frame so as to normalize a phase of the modified residual signal frame.

Moriya teaches a coding method wherein it comprises cyclically shifting samples in the modified residual signal frame so as to normalize a phase of the modified residual signal frame (normalized residual coefficients are cyclically shifted (column 19, lines 1-15), to suppress a pitch component.

Therefore, it would have been obvious to one ordinary skilled in the art at the time the invention was made to modify Lowry's method wherein it comprises cyclically shifting samples in the modified residual signal frame so as to normalize a phase of the

modified residual signal frame, as taught by Moriya, to provide flattened fine structure coefficients (column 28, lines 13-32).

7. **Claims 5, 15 and 25** are rejected under 35 U.S.C. 103(a) as being unpatentable over Lowry in view of Laroia et al. (USPN 5,839,098), hereinafter referenced as Laroia.

Regarding **claims 5, 15 and 25**, Lowry discloses a method wherein the transformation function changes the time scale of the residual signal by performing operations that include:

selecting a set of samples from the residual signal, wherein the set of samples is a consecutive sequence of samples taken from the residual signal (consecutive), such that the set of samples corresponds to a contiguous interval of time in the residual signal (column 4, lines 40-47), but does not specifically teach performing linear interpolation between samples in the first set of samples so as to model the residual signal over said contiguous interval of time as a piecewise linear function and generating the modified residual signal by generating a new sequence of samples from the piecewise linear function such that the cardinality of the new sequence of samples is equal to the same fixed number of samples as contained in the residual signal frame.

Laroia discloses a method to identify pitch pulses (column 7, lines 13-22) by performing linear interpolation between samples in the first set of samples (linear interpolation; column 9, lines 4-16) so as to model the residual signal over said

contiguous interval of time as a piecewise linear function (piecewise linear function; column 9, lines 38-43); and

generating the modified residual signal by generating a new sequence of samples from the piecewise linear function such that the cardinality of the new sequence of samples is equal to the same fixed number of samples (frames of fixed numbers) as contained in the residual signal frame (column 6, lines 25-62), to improving speech.

Therefore, it would have been obvious to one ordinary skilled in the art at the time the invention was made to modify Lowry's method wherein it performs linear interpolation between samples in the first set of samples so as to model the residual signal over said contiguous interval of time as a piecewise linear function and generates the modified residual signal by generating a new sequence of samples from the piecewise linear function such that the cardinality of the new sequence of samples is equal to the same fixed number of samples as contained in the residual signal frame, as taught by Laroia, to enhance the characterization for producing an improved perceptual accuracy in corresponding synthesized speech (column 4, lines 14-18).

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jakieda R. Jackson whose telephone number is 571.272.7619. The examiner can normally be reached on Monday through Friday from 7:30 a.m. to 5:00p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Hudspeth can be reached on 571.272.7843. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JRJ
September 14, 2006

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